INSTRUCTIONS

LUBRICATING-OIL PUMP
PARTS 139X1132 & 139X1146

CONTENTS

	Page
APPLICATION	1
DESCRIPTION	1
REMOVAL FROM ENGINE	1
DISASSEMBLY	2
MAINTENANCE	2
REASSEMBLY	3
INSTALLATION ON ENGINE	4
DATA	4
TORQUE VALUES	5

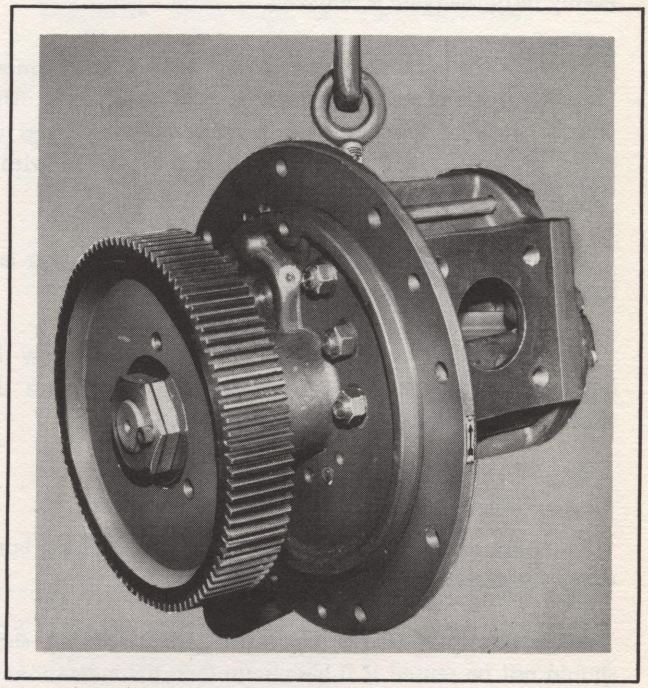


FIG. 1, E-9927

FIG. 1. LUBRICATING-OIL PUMP.

APPLICATION

Two sizes of lube-oil pumps have been used on GE FDL engines. Both sizes of pumps are similar; the major difference is in the length of the casing and pump gears and, consequently, in the pumping capacity. Sixteen-cylinder engines use the larger pump, Part 139X1132; eight-cylinder engines use the smaller pump, Part 139X1146; twelve-cylinder engines have used both sizes of pumps, depending on the engine application.

DESCRIPTION

The lube-oil pump (Fig. 1) is of the positive-displacement gear type. Its tapered shaft is fitted with a keyed drive gear which is driven by the engine idler gear. The pump is rabbet-fit to the free-end cover to provide interchangeability and self-alignment. The pump is held in place by a bolted flange, which is sealed by a gasket.

Two gears, contained in the pump, rotate in bronze bushings and are lubricated by the oil being pumped.

REMOVAL FROM ENGINE

Drain the oil from the engine crankcase, the free-end cover, the cooler, and the filter. See Draining the System in the LUBRICATING-OIL SYSTEM instructions.

Disconnect the discharge pipe at the pump.

Install a 3/4 in.-10 lifting eyebolt into the pump casing, and attach a crane hook to support the pump weight.

Remove the pump flange bolts. Install 5/8 in.-11 jack bolts in the holes provided, and turn the bolts evenly until the pump can be removed.

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

Verify numbers for parts, tools, or material by using the Renewal Parts or Tool Catalogs, or contact your General Electric representative for assistance. Do not order from this publication.

DISASSEMBLY
(See Fig. 3 or 4)

Remove the drive-gear lock nut, drive gear and key from the drive shaft. Three holes are provided in the gear hub to facilitate the use of the gear puller as shown in Fig. 2.

Remove the hex nuts from the pump face plate. Install 1/2 in.-13 jack bolts into the holes provided, and jack evenly until the plate is removed.

Remove the outer bushings. Note the numbers stamped on each bushing and faceplate or backplate, to provide correct bushing location during reassembly. Bearings on newer pumps have tapered bores and are marked with a "T" suffix.

Remove the drive gear and shaft and the idler gear and shaft.

To remove the casing from the backplate, unscrew the hex nuts on the backplate and pull the plate from the casing. Remove the backplate bearing bushings.

MAINTENANCE

Carefully examine the surface of the gears. Slight burrs may be removed with a hand stone.

Magnaflux† the shafts to inspect for cracks. A shaft should not be reused if it has circumferential indications in the fillets between journals and gear end faces; neither should it be reused if the journal is heat-checked or shows crack indications.

With a file, remove all burrs and foreign matter on mating surfaces such as both faces of the bronze bearing bushings and the gasketed surfaces of the endplates and casing.

Examine the bearing bushings for excessive wear. Condemn the pump if the gears rub the case bore. Examine the gears carefully for signs of wear or bending of the shaft ends.

Correct dimensions and tolerances for new and worn pumps are given in the DATA section, and these should be used to determine the pump condition. Pumps should be within specified tolerances before being put in service.

Should studs become loose, they should be reassembled to the faceplate or backplate in the following manner:

†Reg. Trademark of Magnaflux Corporation.

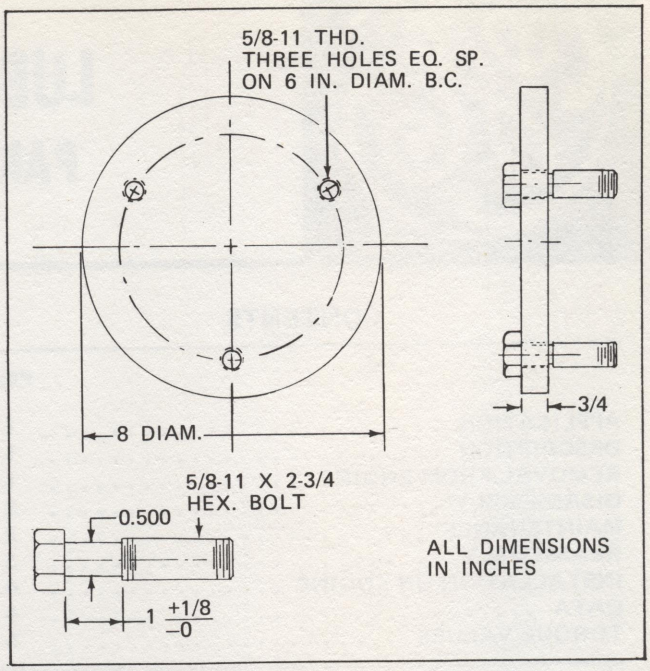
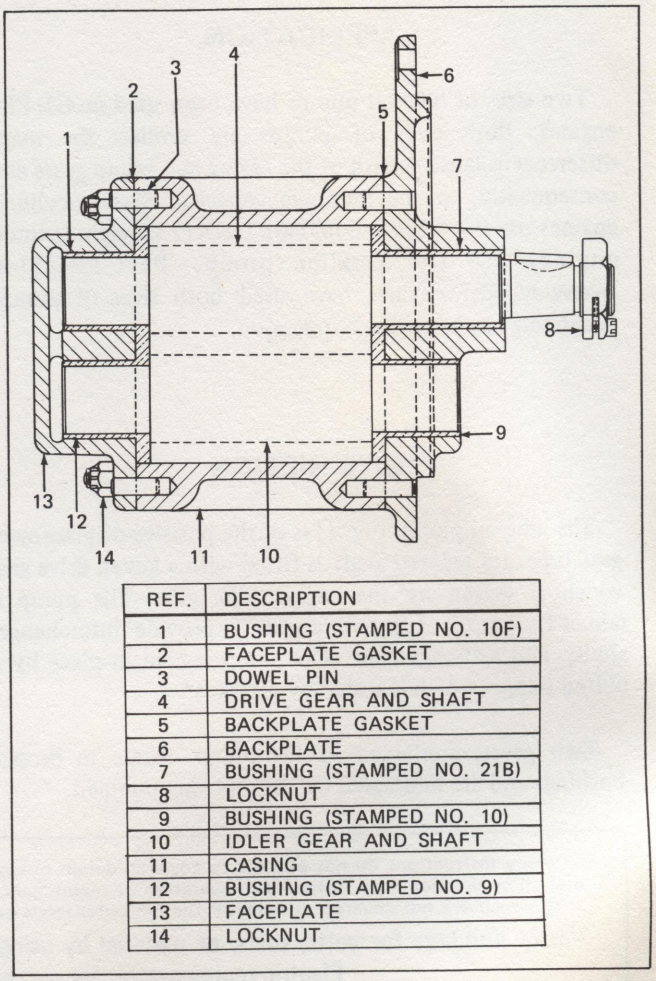


FIG. 2. GEAR PULLER DETAILS.



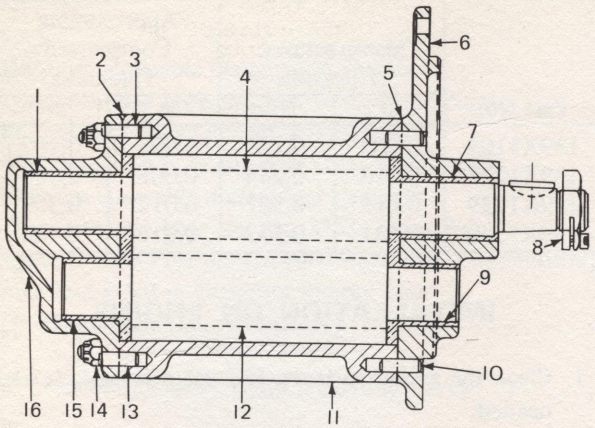
REF.	DESCRIPTION
1	BUSHING (STAMPED NO. 10F)
2	FACEPLATE GASKET
3	DOWEL PIN
4	DRIVE GEAR AND SHAFT
5	BACKPLATE GASKET
6	BACKPLATE
7	BUSHING (STAMPED NO. 21B)
8	LOCKNUT
9	BUSHING (STAMPED NO. 10)
10	IDLER GEAR AND SHAFT
11	CASING
12	BUSHING (STAMPED NO. 9)
13	FACEPLATE
14	LOCKNUT

FIG. 3. CROSS-SECTION OF SMALL LUBE-OIL PUMP, PART 139X1146.

FIG. 2, E-25067

FIG. 3, E-10002C

FIG. 4, E-13161A



REF.	DESCRIPTION	REF.	DESCRIPTION
1	BUSHING (MARKED 21F)	9	BUSHING (MARKED 10)
2	FACEPLATE GASKET	10	DOWEL PIN
3	DOWEL PIN	11	CASING
4	DRIVE GEAR AND SHAFT	12	IDLER GEAR AND SHAFT
5	BACKPLATE GASKET	13	DOWEL PIN
6	BACKPLATE	14	LOCK NUT
7	BUSHING (MARKED 21B)	15	BUSHING (MARKED 9)
8	LOCK NUT	16	FACEPLATE

FIG. 5, E-25069

FIG. 4. CROSS-SECTION OF LARGE LUBE-OIL PUMP, PART 139X1132.

1. Thoroughly clean both the stud thread and tapped hole. Remove all trace of oil by cleaning with Locquic* Primer, Grade N or T.

2. Apply Loctite* Stud Lock to threaded surfaces and assembly. No special torque is required.

REASSEMBLY

1. Clean and lubricate all parts to be assembled.

2. Assemble the bearing bushings, making sure the stamped number on the bushing matches that on the backplate.

NOTE: *Make certain all oil grooves are clean and extend the full length of the bushing bore.*

NOTE: *In early 1972, the fillet radii at the bearing shoulders of the pump shafts were increased to 0.120 in. (3,05 mm). At the same time, the chamfers in the bushing bores were increased to accomodate the larger radii. Make certain the bushings used will fit completely to the gear faces, without binding on the radii.*

3. Secure the backplate to the casing.

4. Using a tool clamped around both faceplate journals of the gears, insert the gear shafts in their proper locations, Fig. 5.

5. Assemble the bearing bushings in their corresponding locations in the faceplate.

6. Secure the faceplate to the casing, and tighten the hex nuts in increments in a criss-cross manner to 70 lb.-ft. (95 N·m) of torque. Lubricate all threads with Lubriplate* Spray Lube "A", Part 147X1614.

7. Rotate the shaft by hand to insure gears and bearings are not binding.

8. Check axial end clearance, and correct if outside the limits given in the DATA section. Use the following procedure:

   a. Set up a dial indicator as shown in Fig. 6. Attach the magnetic base of the indicator to the pump backplate; position the indicator probe on the face of the drive gear or on the face of the gear lock nut, which can be temporarily assembled.

   b. Move the drive gear to its two extreme axial positions and note the indicator movement (end clearance).

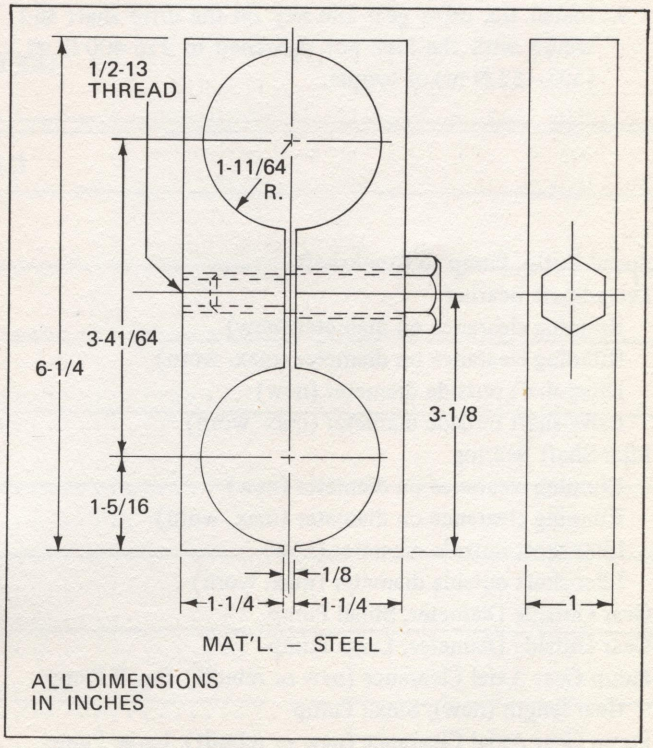


FIG. 5. GEAR ASSEMBLY TOOL.

*Product of Loctite Corp.

*Product of Fiske Bros. Refining Co.

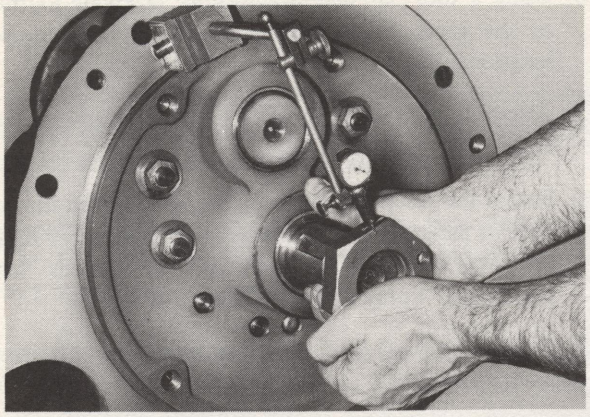


FIG. 6. USING DIAL INDICATOR TO DETERMINE END CLEARANCE.

FIG. 6, E-21503

c. If end clearance is not within the limits given in the DATA section, adjust the thickness of the gasket between the faceplate and casing. New pumps usually have two Part 139X1102 gaskets, each 0.005 in. (0,127 mm) thick, at this location. Use either standard 0.005 in. (0,127 mm) thick gaskets or thicker gaskets, shown in Table I, to vary the gasket thickness and, thus, achieve correct end clearance.

9. Install the drive gear and key on the drive shaft and secure with the lock nut tightened to 375-400 lb.-ft. (508-452 N·m) of torque.

TABLE I, FACEPLATE GASKETS

Part No.	Manufactured Thickness		Approximate Compressed Thickness	
	in.	mm	in.	mm
139X1102	0.005	0,127	0.004	0,102
139X1238	0.010	0,254	0.008	0,203
139X1239	0.015	0,381	0.012	0,305
139X1240	0.021	0,533	0.016	0,406

INSTALLATION ON ENGINE

1. Clean the gasket surfaces, and use new gaskets where needed.
2. Insert a 3/4 in.-10 lifting eyebolt into the oil-pump housing (see Fig. 1). Position the pump on the engine with an overhead crane.
3. Hand-tighten the pump and discharge pipe bolts to ensure the compression pipe coupling is aligned.
4. When the pipes are aligned, tighten the mounting bolts to 90 lb.-ft. (122 N·m) of torque if bolts are dry; to 70 lb.-ft. (95 N·m) of torque if bolts are lubricated.

Close the oil drain valves and fill the crankcase to the proper level before starting the engine. After starting the engine, check the lube-oil pump for overheating or unusual noises. The engine lube-oil pressure should agree with the values shown in the DATA section. I*

DATA

	English	Metric
Speed Ratio, Pump to Crankshaft	1.104 to 1	
Drive-Shaft Bearing		
Running clearance on diameter (new)	0.0055-0.007 in.	0,140-0,178 mm
Running clearance on diameter (max. worn)	0.012 in.	0,305 mm
Drive-shaft outside diameter (new)	2.3060-2.3065 in.	58,572-58,585 mm
Drive-shaft outside diameter (max. worn)	2.305 in.	58,547 mm
Idler-Shaft Bearing		
Running clearance on diameter (new)	0.0055-0.0070 in.	0,140-0,178 mm
Running clearance on diameter (max. worn)	0.012 in.	0,305 mm
Idler-shaft outside diameter (new)	2.3060-2.3065 in.	58,572-58,585 mm
Idler-shaft outside diameter (max. worn)	2.305 in.	58,547 mm
Gear Outside Diameter, Small Pump	4.361-4.360 in.	110,769-110,744 mm
Gear Outside Diameter, Large Pump	4.351-4.352 in.	110,515-110,541 mm
Pump Gear Axial Clearance (new or rebuilt), Small Pump	0.010-0.020 in.	0,254-0,508 mm
Gear length (new), Small Pump	7.498-7.501 in.	190,449-190,525 mm
Pump Gear Axial Clearance (new or rebuilt), Large Pump	0.016-0.026 in.	0,406-0,660 mm
Gear length (new), Large Pump	10.998-11.001 in.	279,349-279,425 mm
Maximum allowable diametrical clearance between case bore and gear O.D., Small Pump	0.020 in.	0,508 mm

*Revisions are indicated by marginal bars.

DATA (Cont'd.)

	English	Metric
Maximum allowable diametrical clearance between case bore and gear O.D., Large Pump	0.029 in.	0,737 mm
Minimum allowable diametrical clearance between case bore and gear O.D., Small Pump	0.017 in.	0,432 mm
Minimum allowable diametrical clearance between case bore and gear O.D., Large Pump	0.026 in.	0,660 mm
Engine Header Pressure (Normal Operating Temperature)		
At Test Point in Governor Supply Line		
Engine idle (approximately)	20 psi	1,41 kg/cm^2 or 138 kPa
Engine full speed (with regulating valve)	65-75 psi	4,57-5,27 kg/cm^2 or 448-517 kPa
Engine full speed (without regulating valve)	75-100 psi	5,27-7,03 kg/cm^2 or 517-689 kPa

TORQUE VALUES

Lube Pump Drive-Gear Nut	375-400 lb.-ft.	508-542 N·m
Lock Screw on Drive-Gear Nut	30-36 lb.-ft.	41-48 N·m
5/8 in.-11 Mounting Bolts (Pump to F.E. Cover)		
Dry	90 lb.-ft.	122 N·m
Lubricated	70 lb.-ft.	95 N·m
5/8 in.-11 Lock Nuts, Lubricated (Faceplate and Backplate to Casing)	70 lb.-ft.	95 N·m

NOTES: